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ABSTRACT

A study investigated whether young children use sentence accent to mark new information as systematically as they have been shown to handle contrastive stress within naturally-occurring discourse. Data were drawn from the spontaneous conversations of a boy-and-girl twin pair with adults. The twins' speech was coded in carefully-defined categories in an effort to overcome methodological problems. The findings suggest that by this age, the two children had made an important connection between their prosodic and pragmatic systems, using sentence accent to mark the distinction between old and new information in an appropriate way more than 85 percent of the time, and using contrastive stress appropriately over 90 percent of the time. The children's use of self-correction corroborated these conclusions. (MSE)

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The assignment of sentence accent and contrastive stress by two 28-month-old twins

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Although we know a great deal about how the young language learner progresses from single words to more complex syntax, we understand relatively little about the child's development of intonation--particularly after the one-word stage. From a look at the literature, it seems that, as soon as children produce anything approaching a recognizable syntactic structure, all interest in intonation is abandoned--except, of course, as a means for establishing "utterance boundaries." But more recently, thanks to the blossoming study of developing communicative competence, we are now learning much more about young children's use of prosody on the pragmatic level. Here, the focus has been on the learner's ability to use prosodic means to mark the informational structure of a discourse. Specifically, what is examined is the systematic placement of "contrastive stress" (also known as "heavy stress," "emphatic stress" and "tonicity") with regard to the distinction between "old" and "new" (or given/new, topic/comment) elements comprising an utterance.(2) In spoken English,the most common way of signalling this distinction is by endowing the new information with greater acoustical prominence, making the most informative part of the utterance the most salient by placing it in the perceptual foreground of the listener's attention.

From the literature it would appear that English-speaking children learn this connection between the prosodic and the pragmatic system very early; children as young as 33 months--it is claimed--consistently use emphatic stress to mark new information in a pragmatically appropriate way.

But unfortunately, most every study investigating stress placement by young children suffers from two important limitations:

In the first place, almost all of these studies rely upon experimentally-elicited speech, using picture description tasks to evaluate children's competence. But the ability these experimenters are trying to tap--children's adult-like marking of the old/new information distinction--is inherently part of connected, INTERACTIVE discourse.

The second problem is a descriptive one: perhaps because of the pervasiveness of the vague term "contrastive stress," these studies confuse making a contrast with the addition of new information. Although they set out to test children's ability to prosodically mark informational distinctions, these researchers use experimental tasks which instead involve the use of stress to mark CONTRAST.

This distinction, though generally blurred, is real and especially important in terms of acquisition. Adding new information to a discourse and making a contrast with a previous proposition differ on many counts, even though the means of marking them--in English--are similar. For one thing, a contrastive item, though stressed, need not be new information. In addition, making a contrast involves preserving the syntactic frame of the sentence that's being contested; the stressed items are substituted into slots forged by the preceeding utterance. But the process of adding new information to a discourse topic is not structurally constrained in this way; mention of the entitiy being "talked about" is simply maintained, and a new predication is made about it.

So, in light of the limitations of previous research--the confusion of contrast and new information marking, and the questionable validity of non-naturalistic testing of a

discourse phenomenon--the only thing we may conclude with any certainty is that, within an experimental context, children are able to use prosody to mark contrast. Whether young children can use stress to indicate the old/new information distinction remains unknown.

Thus the goal of the present study was to overcome these limitations and ask: Do young children use sentence accent (a less ambiguous term than stress) to mark new information as systematically as they have been shown to handle contrastive stress--within the course of NATURALLY-OCCURING discourse?

The main hypothesis of this study was that children would use stress to mark contrast more consistently, in a pragmatically appropriate way, than they would new information. Contrastive stress would seem, in some sense, "simpler" to apply--you just borrow the frame of the previous utterance and add a little physiological pressure to the item you substitute. In contrast, distinguishing new information from old and marking it appropriately would require the child to have a tacit understanding of the discourse structure; this, in turn, entails the ability to recognize the discourse topic and, at a higher level, to model the interlocuter's knowledge base.

To test this hypothesis, I examined the speech of two 28-month-old twins, a boy and a girl, children of a white middle class couple. The data were gathered naturalistically, in three one-hour sessions, in the children's home, where the spontaneous conversation of the twins with several adults was recorded.

I will describe the coding of the twins' speech in some detail because, clearly, one of the major challenges in studying pragmatic/discourse phenomena is formulating well-defined and valid categories with which to analyze the data.

First, for each of the twins' utterances, the word judged perceptually as bearing more acoustic prominence than any other was coded as stressed. (Inter-coder reliability = 96.6%) Perceptual judgement is the conventional means used to code stress; and, in fact, in the case of the present speech samples, stressed items were,in most cases, extremely more prominent than non-stressed items.

Not all of the utterances, however, could be included in the final analysis.

Unintelligible, interrupted and yes/no responses were excluded for obvious reasons; yes/no questions were not included becuase they conventionally have a gradually rising intonation, with no single element singled out for stress; for " elliptical" utterances--those lacking old information --there was no way to determine whether the new item was stressed because it was new, or because it was the only content ("open class") item in the utterance.

The percentage of utterances which had to be excluded from the analysis was the same for both twins--55.7%. From twin 1's speech,363 utterances were used (44.3%), and 255 from twin 2 (also 44.3% of the corpus).

These remaining utterances were coded for a number of features. Here, it would be most appropriate to explain the criteria used to classify tokens along the most crucial dimensions: Comment, contrast and misfire.(3)

An utterance was classified as COMMENT if the lexical item stressed was a comment not previously expressed by any of the interlocuters made upon a topic which had already been introduced into the discourse, and mentioned in at least one of the immediately preceding 10 turns at talk. If the topic was mentioned in the utterance immediately preceding the utterance being coded, but by a different speaker, it was coded as OTHER-COMMENT; if the topic was not included in another speaker's preceding utterance, but in the preceding turn of the same speaker--the child--the utterance was coded as SELF-COMMENT.(4)

Two examples of OTHER-COMMENT are shown in example 1 below.(5)

(1) T1>B: i saw the BALL/
B>T1: you saw the ball?/
T1>B: the tiny little RED one/
B>T1: ohh, a ball off my purse?/
T1>B: it DROPPED/

An utterance was coded as a COMMENT-MISFIRE if it included a word which was a COMMENT according to the criteria given above, but was not the word which received the sentence accent. Please see example 2.

(2) T1> R: i want my HAT/
i want my HAT/
R>T1: oh, where's your hat?/
T2> R: it's on (.) the: sta- /
T1> R: -i'm gonna go-go FIND my-
i'm gonna go find my HAT/

An utterance was considered an instance of CONTRAST if it was structurally almost identical to a preceding utterance (within 10 turns of talk), except for a substituted lexical item which received contrastive stress. If the utterance upon which the token being coded was produced by the same speaker--the child, that is, it was coded as SELF-CONTRAST; if the model utterance was produced by a different speaker, it was coded as OTHER contrast. Number 3 below gives an example of OTHER contrast:

(3) T1> R: i'm gonna build them ON the black thing/ [=blocks]
R> T1: how 'bout if you build it on the wastepaper basket?/
T1> R: i'm gonna build it on the TABLETOP/

An utterance was coded as CONTRAST-MISFIRE if it satisfied the structural criteria given for CONTRAST, but included stress which was placed on an item other than the substituted word. Please see example 4.

(4) B> T2: what do you have on?/
what color do you have on, C----?/
T2> B: i have a blue shirt TOO/
B> T2: but you don't have it on/
T2> B: but i have-on my-i have a blu:e shi:rt too:/
B> T2: uhmmm, you have a blue shirt/
T1> B: i have a blue SHIRT/

RESULTS

Table 1 gives a general breakdown of the number and proportion of utterance types found in the speech sample of each twin; as can be seen, the distributions are amazingly similar across the two children. The largest percentage of

utterances fell into the COMMENT category, with the proportion of OTHER COMMENT twice as high as SELF COMMENT for both children; this pattern is repeated in the CONTRAST category. However, both of the young speakers repeated their own utterances more often than others' speech.

TABLE 1: Distribution of Utterance Types

UTTERANCE TYPE	TWIN 1	TWIN 2
Topic-initiating	17.8% (65/363)	18% (46/255)
Repetition---Self	20.1% (73/363)	12.2% (31/255)
Other	2.6% (10/363)	10.6% (27/255)
Comment------Self	9.7% (35/363)	6.7% (17/255)
Other	19.3% (70/363)	27.5% (70/255)
Contrast-----Self	5.2% (19/363)	2% (5/255)
Other	13.2% (48/363)	16.9% (43/255)
Misfire--Comment	4.7% (17/363)	3.5% (9/255)
Misfire--Contrast	1.9% (7/363)	2% (5/255)
	n = 363	n = 255

Turning now to our major hypothesis, we can see from the figures on Table 1 that the proportion of MISFIRE--that is, the misapplication of sentence accent or contrastive stress--in the children's speech is quite small; in each case the percentage of mistakes is less than 5% of the total corpus; and combined, the errors comprise less than 7% of the total. As early as 28 months, then, these children appear to be quite competent at assigning sentence accent and contrastive stress in a pragmatically appropriate way.

In order to compare the percentage of errors between categories, the ratio of misfire to total number of utterances within a given category was calculated, and is presented in Table 2:

TABLE 2: Misfire within Category

MISFIRE TYPE	TWIN 1	TWIN 2
Misfire-Comment/Tot.Comment	17/122 (13.9%)	9/96 (9.4%)
Misfire-Contrast/Tot. Contrast	7/74 (9.5%)	5/53 (9.4%)

Although TWIN 1 has a higher percentage of misfire-comment tokens, for neither twin is there a significant difference between the two misfire types. This result disconfirms the original hypothesis: these children apply sentence accent to mark new information equally consistently as they use contrastive stress. Overall, they used prosodic marking appropriately for BOTH functions in well over three-fourths of the instances where they used stress at all.

Now, we might predict that prosodic "misfires" would be made more often when the children were commenting upon another speaker's topic or making a contrast with another's utterance. As the figures on Table 3 indicate, however, this is true for only one of the twins; for the other, more mistakes occured in SELF-COMMENT and SELF-CONTRAST tokens:

TABLE 3: Misfire--Self vs. Other

MISFIRE TYPE	TWIN 1	TWIN 2
Misfire-self/Total Misfire	20/24 (83.3%)	5/14 (35.7%)
Misfire-other/Total Misfire	4/24 (16.7%)	9/14 (64.5%)
	n = 24	n = 14

Since we've found that both twins marked new information consistently, we might ask whether they regularly marked old information as well, with the use of discourse anaphoric pro-forms. Table 4 shows the number of SELF-, OTHER-, and MISFIRE-COMMENT tokens which contained an anaphoric form:

TABLE 4: Tokens Containing Anaphoric Forms

	TWIN 1	TWIN 2
Other-Comment	64.3% (45/70)	62.9% (44/70)
Self-Comment	60.0% (21/35)	64.7% (11/17)
Total Comment	62.9% (66/105)	63.2% (55/87)
Misfire Comment	22% (2/17)	0 (0/9)

For both children, in two-thirds of the utterances in which sentence accent was correctly assigned to the "new" element, the old information was conveyed by an anaphoric form. This suggests that these children are able to mark the "old-new" distinctions using a variety of linguistic devices. Significantly, when the twins assigned sentence accent incorrectly, they were much less likely to use an anaphoric form, indicating that perhaps some kind of co-occurence restriction is in force.

If we examine utterances which lacked old information--those which introduced a discourse topic--we can discover the distribution of stress placement when the "old-new" constraint is lifted. In the speech of both of the twins, objects and "other" (most of them predicate nominatives) were favored for stress placement, while subjects and prepositions were clearly disfavored; the only comparison we can make here with adult norms involves the incidence of stress on the last lexical item in an "all-new" utterance. According to Ladd (1979), who is concerned with adult speakers of English, in the unmarked or neutral case--where the whole intonation-group is considered "new"--stress typically occurs on the last lexical item in the intonation-group.

In the twins' speech,though, this neutral pattern of stress placement described above is not used consistently to introduce all-new utterances into the discourse. As you can see from the figures in the first row of Table 5, for one

child, two-thirds of the topic-initiating utterances contained a final accented lexical item; this was true only half the time for the other twin. It appears, then, that at this age these children are better skilled in the use of sentence accent to mark new information, and less adept in the placement of accent in the neutral case, where all the information contained in an utterance is new.

Perhaps one reason for this marked accent placement in topic-initiating utterances is that the children themselves do not interpret these utterances as "all-new." This possibility is indicated by the children's inappropriate use of pronouns to introduce new entities into the discourse (excluding the deictic use of such forms which can be, of course, appropriate):

TABLE 5: Topic-initiating Utterances

Type of T.I. utterance/ Total	TWIN 1	TWIN 2
Last Item Stressed/ Total T.I.	31/65 (47.4%)	29/46 (63%)
Inappropriate Pronoun/ Total T.I.	10/65 (15.4%)	6/46 (13%)
Non-final Stress/ Total T.I. + Pronoun	8/10 (80%)	5/6 (83.3%)

As you can see in the last two rows in table 5, pronouns were inappropriately used in less than one-fifth of the twins' topic-initiating utterances; but when then did occur, the accent was seldom placed on the last lexical item. This pattern may indicate that in these utterances the children were making an "old-new" distinction even though the "old" enitity had not been mentioned in the immediately preceeding talk.

DISCUSSION

Based on the speech samples analyzed here, we can say with some certainty that, by the age of 28 months, these two children have made an important connection between two components of their developing linguistic competence--their prosodic system and their pragmatic system. The twins used sentence accent to mark the distinction between old and new information in an appropriate way better than 85% of the time; and they employed contrastive stress in more than 90% of the utterances which called for its use. It is reasonable to claim that these twins have attained almost complete mastery over this aspect of their prosodic system.

Finally, I'd like to offer more convincing evidence, which comes from the children themselves in the form of self-corrections. Several times during the recording, the twins corrected their placement of sentence accent and contrastive stress. Examples 6-8 were taken from the transcript:

(6) T1> R: can I put fire on your buns?/
can I?/
can I?/

R > T1: I thought you already did/

T1> R: no I DIDNT/

R > T1: oh well, then, don't/

T1> R: well I'm gonna-i'm GOING to put fire-
I'm GOING to put fire on your buns/

(7) T1> R: when YOU have fire in mouth/
YOU cry for your mom an' daddy/
R> T1: yeah proababy/

T1> R: **when claudia--when cl-CLAUDIA got fire in HER mouth/**
she cry for HER mom an' daddy/

(8) T1> R: do you have some footies (.) at home?/
R > T1: yeah/
at home I have
some footies/
do you have some
footies?/
(.5)
no?/

T2> R: I do/

R> T2: you do?/

T2> R: hunh/
in MY-in my SHOES/

It would be hard to imagine why these children corrected their prosody in this way unless we attribute to them a tacit knowledge of the "rules" governing sentence accent and contrastive stress placement.

How might these rules be learned by young children? And learned they must be, for the way in which a language's suprasegmental system is integrated with its segmental patterning is language specific, even in the use of sentence accent to mark focus or new information. Because this method of distinguishing topic from comment is clearly not universal (in Russian, for example, the comment is signalled by a drop in pitch), it must be learned. But how?

Part of the answer might lie in the nature of the learner's verbal input. Almost every description of caregiver speech to infants includes the observation of exaggerated intonation and/or unusual prosodic features, but only for English have these suprasegmental peculiarities been analyzed. Fernald & Mazzie (1983) found that white-middle class mothers, when talking to their 14-month old infants, consistently placed unusually high pitch peaks on the new information contained in an utterance. Given infants' perceptual bias toward high pitch (Fernald, 1985), it is likely that they do attend to this acoustical-highlighting pattern. For children of English-speaking caregivers who indulge in motherese, this means heavy exposure--begun early--to this prosodic/pragmatic regularity in their target language; such early and prolonged "training" might account--in part--for the precocious acquisition of the complex co-ordination of prosody and pragmatics we have documented here.

NOTES

1. I would like to thank Julie Roberts, Thomas Steele, and in particular, Bambi Schieffelin for their help and support.

2. The relevant studies are included in the references below.

3. The taxonomy of given and new information presented in Prince, 1981 distinguishes between "inferrable" and "situationally evoked" entities; although the entities mentioned in a discourse which fall into these categories pattern in some ways like "old" information (e.g. they typically take definite articles), with regard to sentence -accent placement they behave like "new" entities. This strange distribution has scarcely been noticed, but see Brown, 1983 which shows that "inferrable" entities do receive accent.

4. Clearly an instance of OTHER COMMENT could be a SELF COMMENT as well; the classification here was made (artificially) exclusive, since it is probably impossible to determine whether a child intends his utterance as a comment upon his own or his interlocuter's previous utterance. If such a distinction could be reliably made--perhaps using video data--it would be extrodinarily helpful in establishing whether the children are making the old-new contrast with regard to their listener's knowledge base--an issue that has not been considered here.

5. Transciption conventions are as follows:
   1) The twins' utterances are given in the left column; the adults' are on the right.
   2) A lexical item in all-caps denotes the stressed word.
   3) Lengthening has not been noted.
   4) T1 = Twin 1, male T2 = Twin 2, female
      R = Experimenter B = the twins' babysitter (an adult female)

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